

METHOD TO ADDRESS INFREQUENT TRANSMISSION

BACKGROUND

[0001] 1. Field

[0002] Communication systems, such as an evolved packet system, may benefit from methods for addressing infrequent transmissions. In particular, certain communication systems in which machine type communication devices are deployed may benefit from a machine type communication feature for infrequent transmission.

[0003] 2. Description of the Related Art

[0004] The evolved packet system (EPS), the successor of general packet radio system (GPRS), provides radio interfaces and packet core network functions for broadband wireless data access. EPS core network functions include the mobility management entity (MME), the packet data network gateway (PDN-GW) and the Serving Gateway (S-GW). An example of an evolved packet core architecture is illustrated in FIG. 1 and is described by third generation partnership project (3GPP) technical specification (TS) 23.401, which is incorporated herein by reference in its entirety. A common packet domain core network can be used for both radio access networks (RANs), the global system for mobile communication (GSM) enhanced data rates for GSM evolution (EDGE) radio access network (GERAN) and the universal terrestrial radio access network (UTRAN).

[0005] For machine-type-communication (MTC) a functional entity called MTC interworking function (MTC-IWF) and several new interfaces, including S6m, Tsp, Tsms, T5a/b/c and T4, have been introduced to the 3GPP architecture. FIG. 2 illustrates machine-type-communication additions to the 3GPP architecture, as well as the various interfaces identified. The MTC-IWF and the new interfaces in 3GPP Release 11 (Rel 11) can, for example, enable triggering of devices with or without a mobile subscriber integrated services digital network number (MSISDN) from an internal or external MTC server. The triggering of the devices may be, for example, in order to establish a packet data network (PDN) connection and/or packet data protocol (PDP) context. A 3GPP architecture for machine-type communication is discussed in 3GPP TS 23.682, which incorporated herein by reference in its entirety.

[0006] Certain MTC devices, such as smart meters, may send and/or receive infrequently compared to devices such as mobile phones. Conventionally, transmission of data in such systems is performed using an established bearer. Thus, the bearer remains active until the user equipment or network explicitly initiates deactivation of the established bearer.

SUMMARY

[0007] According to certain embodiments, a method includes negotiating at least one characteristic of a bearer. The method also includes deactivating the bearer based on the at least one characteristic.

[0008] In certain embodiments, an apparatus includes at least one processor and at least one memory including computer program instructions. The at least one memory and the computer program instructions are configured to, with the at least one processor, cause the apparatus at least to negotiate at least one characteristic of a bearer. The at least one memory and the computer program instructions are also configured to,

with the at least one processor, cause the apparatus at least to deactivate the bearer based on the at least one characteristic.

[0009] An apparatus, according to certain embodiments, includes negotiating means for negotiating at least one characteristic of a bearer. The apparatus also includes deactivating means for deactivating the bearer based on the at least one characteristic.

[0010] A non-transitory computer readable medium, in certain embodiments, is encoded with instructions that, when executed in hardware, perform a process. The process includes negotiating at least one characteristic of a bearer. The process also includes deactivating the bearer based on the at least one characteristic.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For proper understanding of the invention, reference should be made to the accompanying drawings, wherein:

[0012] FIG. 1 illustrates an evolved packet core architecture.

[0013] FIG. 2 illustrates machine-type-communication additions to a third generation partnership project architecture.

[0014] FIG. 3 illustrates a signal flow according to certain embodiments.

[0015] FIG. 4 illustrates another signal flow according to certain embodiments.

[0016] FIG. 5 illustrates a method according to certain embodiments.

[0017] FIG. 6 illustrates a system according to certain embodiments.

DETAILED DESCRIPTION

[0018] A machine type communication (MTC) feature for infrequent transmission can be used, for example, with MTC devices that are expected to send or receive data infrequently, with a long period between consecutive data transmissions.

[0019] For an infrequent transmission MTC feature, the network can reserve resources only when transmission occurs. Moreover, when there is data to transmit and/or receive, the MTC device can connect to the network, transmit and/or receive the data, then, following successful transmission/reception, return to a state in which the MTC device is not attached to the network.

[0020] This feature can be used in various ways. For example, this feature can be used by a device that needs to transmit a file infrequently. The file may be a large file, such as a log file. In another example, a user may need access to a network only for a defined period, such as when prepaid access is obtained for a specified duration.

[0021] Certain embodiments, therefore, provide for an infrequent transmission feature. At least one characteristic of the bearer can be negotiated. For example, as shown in FIG. 3, a validity time or duration can be negotiated. Alternatively, as shown in FIG. 4, an end-marker for the bearer can be negotiated. This negotiation can take place when the bearer is being established. The negotiated characteristic can serve to provide an indication to deactivate the bearers with or without an explicit signaling procedure on the control plane. The duration for the bearer can also be limited by a subscription for the device.

[0022] If the user equipment (UE) and the network negotiate validity time for the bearer, then in certain embodiments the network and the UE can locally deactivate the bearers